Climate Test Chamber

System Weiss

Type WK3-2000/40

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FACTS

- Operation, monitoring and documentation of the test chamber are realised by an integrated Industrial PC with Windows XP Embedded including software package S!MCONTROL.
- Digital Measuring and Control System S!MPAC.
- A big, clearly-arranged 12” TFT colour touch screen display serves as interface between man and machine (no programming knowledge required).
- A lighted CONTROLPAD for displaying the operating state is integrated in the door.
- The integrated process visualisation facilitates recalling of all test information. Explanation of the unit function is easily understandable.
- The integrated recording of measuring data guarantees a complete documentation of test runs.
- Data transfer via Ethernet or USB Stick.
- Monitoring and supervision possible from each workstation.
- An auto-adaptive control system continuously optimises the control behaviour.
- Error diagnosis system and inspection system for support of maintenance and repair.
- The hermetic refrigeration systems work with environment-friendly refrigerants without ozone-reducing potential (CFC-free).
- 2 ports (50 and 125 mm Ø) are installed as standard.
- Easily accessible maintenance elements guarantee minimum service times (condenser, water tank, psychrometer).
- Self-cleaning humidity sensor, thus considerable increase in service life of psychrometer.
- Automatic water supply of humidification system with demineralised water.
- Integrated switchable condensation protection prevents condensation formation on specimen during heat-up phase.
- Optimum air guidance and temperature distribution – better than ±1.5 K spatially guaranteed
- Contamination of humidification water is prevented. The humidity bath flushing is standard.
- The units are designed for the performance of extreme climate values (e.g. 85 °C/85 % RH).
- Extreme installation conditions – trouble-free operation can be guaranteed at ambient temperatures of up to 35 °C.

Technical Data WK3-2000/40

Test Chamber

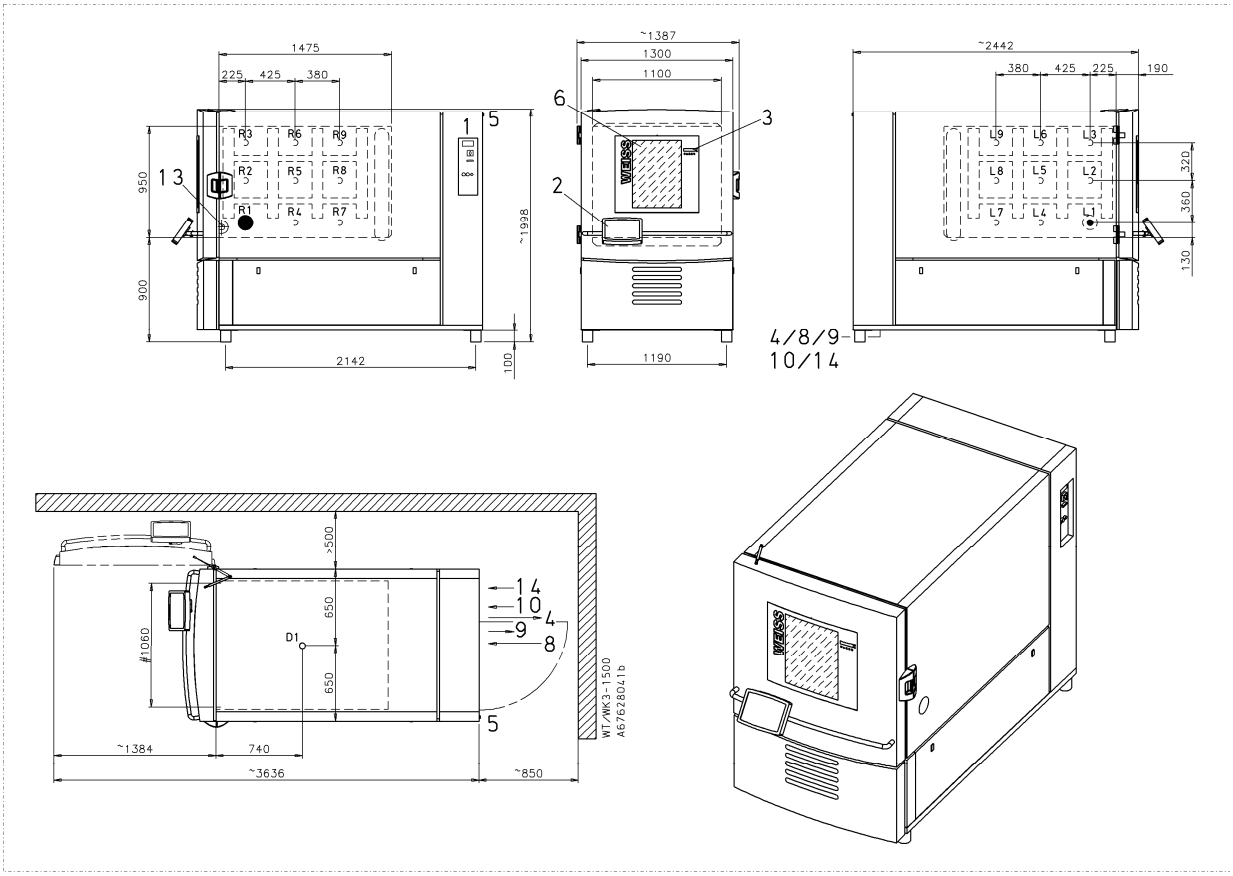
Test chamber material	stainless steel, 1.4301, surface III D polished		
Test area dimensions	height	approx.	950 mm
	width	approx.	1100 mm
	width between shelf supports	approx.	1060 mm
	depth	approx.	2150 mm
Volume of test chamber	approx. 2247 l		
Max. loading	250 kg		
Max. loading of test chamber floor	150 kg distributed load		
Max. load per shelf	50 kg distributed load		
Max. load of shelf supports	100 kg		

Exterior Housing

Material	double-coated galvanised steel sheet		
Dimensions	height	approx.	1995 mm
	width	approx.	1300 mm
	width with door lock and hinge	approx.	1400 mm
	depth without touch panel	approx.	3060 mm
	depth with touch panel	approx.	3280 mm
Required clearances	height	approx.	2000 mm
	width [1]	approx.	1400 mm
	depth	approx.	3200 mm
Finish	two-coloured, powder coated		
	corpus	grey-white	(RAL 9002)
	front	violet-blue	(RAL 5000)
Door	hinged on the left, one-hand-operation, lockable, optimum contact pressure		

[1] The required clearances can be reduced by dismounting components

Installation Drawing



Depth interior 2150 mm (instead 1475 mm)

Depth outside 3055 mm (instead 2442 mm)

- Port included in basic design
  - R1: approx. 125 mm ∅
  - L1: approx. 50 mm ∅
  - R2[1] ... further installation position right
  - L2[1] ... further installation position left
  - D1[1] installation position in ceiling

1. Main switch panel
2. Colour touch panel
3. **CONTROLPAD**
4. Condensation drain
5. Power supply cable length approx. 3,5 m
6. Door without window
8. Cooling water supply[1]
9. Cooling water drain[1]
10. Water supply (demineralised, H_2O)
13. Slotted port[1]
14. Compressed air connection [1]

\# Width between shelf supports

[1] Option

Equipment

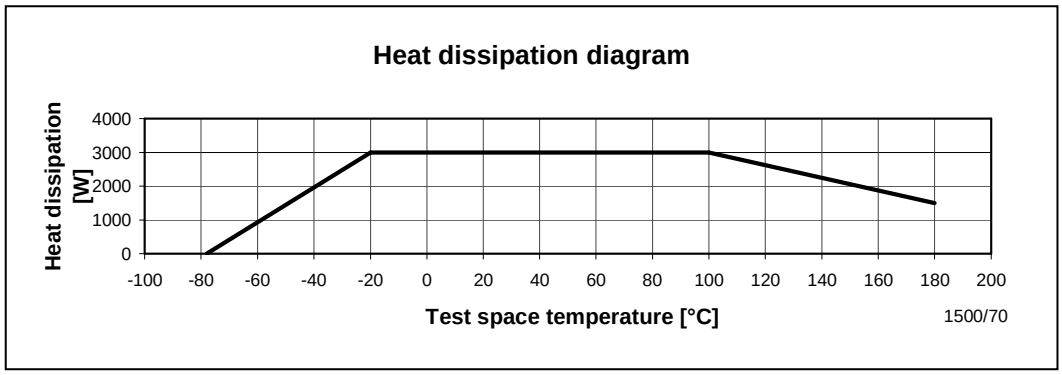
Shelf		1 pc., stainless steel
Ports	right side wall left side wall	1 pc. approx. 125 mm ∅, 1 pc. approx. 50 mm ∅
Refrigeration unit		hermetic, air-cooled refrigeration system
Control		Digital Measuring and Control System S!MPAC and software S!MCONTROL
Infotainment system consisting of: - Industrial PC - Colour touch screen display - CONTROLPAD		 installed in switch cabinet fixed at door front integrated in door, for display and modification of operating state
Interfaces		Ethernet 100/10 Megabit USB interface serial interface RS 232 C
High-/low temperature safety device		as per EN 60 519-2 (1993), with separate sensor, thermal safety class 2
Inlets/outlets for use by customer		4 potential-free outputs for specimen control, 4 inputs 24 VDC

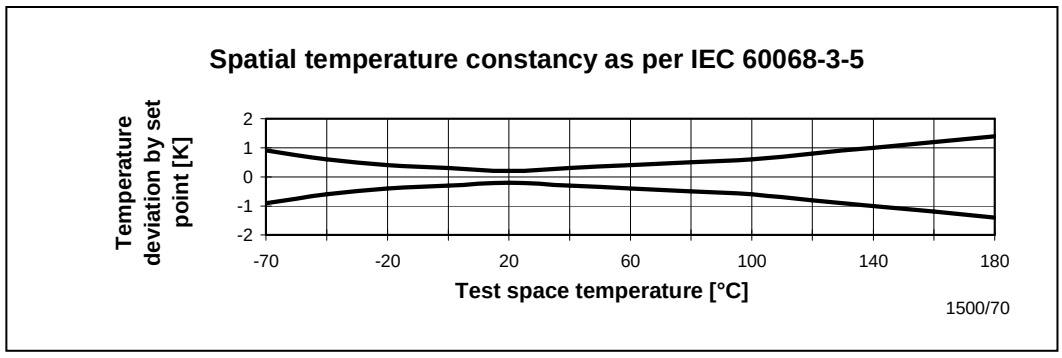
Performance Data

Performances for temperature tests

Maximum temperature	+180 °C
Minimum temperature	-45 °C, discontinuously[2)]
Temperature change rate cooling according to IEC 60068-3-5[3)]	approx. 2 K/min., on average, measured in the air inlet
Temperature change rate heating according to IEC 60068-3-5[3)]	approx. 3 K/min., on average, measured in the air inlet
Temperature deviation as per IEC 60068-3-5, in steady state, depending on the temperature[3)]	±0,1 K to ±0,5 K, in time ±0,5 K to ±1,5 K, in space
Max. heat compensation	3500 W
Calibration values	+23 °C and +80 °C

Performance Diagrams



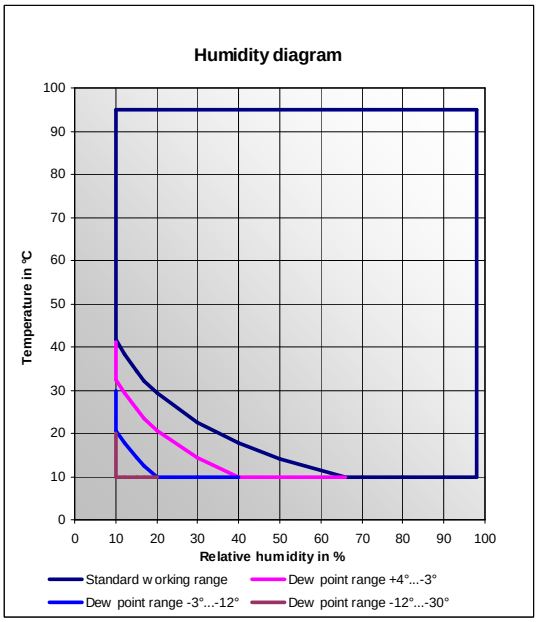


[2)] In case of continuous, long-term operation below +5 °C ice might form on the evaporator if outer humidity is allowed to enter the chamber, for instance, by open apertures, doors or if additional humidity is generated by specimens or others.
In these cases, the evaporator needs to be defrosted from time to time by heating up to ≥+10 °C.

[3)] Working range according to IEC 60068-3-5: +180 °C to –40 °C or –70 °C.

Performances for climate tests according to IEC 60068-3-6

Maximum temperature	+95 °C
Minimum temperature	+10 °C
Dew point temperature range	+4 ... 94 °C (down to -3 °C[4])
Humidity range	10 ... 98 % RH
Humidity constancy, in steady state, depending on the climate value	±1 to ±3 % RH in time
Temperature constancy as per IEC 60068-3-5 in steady state, depending on the temperature	±0,1 K to ±0,3 K, in time ±0,5 K to ±1,0 K, in space
Max. heat compensation	500 W between approx. +25 °C ... +90 °C and humidities of up to approx. 90 % RH
Calibration values	+23 °C / 50 % RH and +95 °C / 50 % RH



4) intermitting operation

Control and Programming S!MPAC and S!MCONTROL

Control/PLC	S!MPAC control with I/O system Windows CE Embedded
Operation/monitoring unit	**CONTROLPAD** integrated in door front
The infotainment system comprises operation/programming/measured data acquisition/monitoring and evaluation system	Industrial PC with Windows XP Embedded 12“ TFT colour touch display 800x600 and software S!MCONTROL
Switch inputs (digital) Switch outputs (digital)	4 (load max. 24 V-DC, approx. 30 mA) 4 (load max. 24 V-DC, approx. 0,5 A)
Password protection	up to 9 access levels freely configurable
Limit value monitoring system	for temperature and humidity
Diagnostic system	for information on operating times and possible operating failures
Serial interface RS 232C	for connection to a host computer system or for networking
USB interface	for data exchange via USB stick or as printer interface
Ethernet interface	for embedding into network

Other

Power supply	3/N/PE AC 400 V ±10 % 50 Hz, different voltages and frequencies optional
Mains plug	CEE-plug, 32 A
Protection type	• Test chamber IP 22 • Electrical / operating panel IP 54
Noise emission	as per EN 61000-6-3
Noise immunity	as per EN 61000-6-2
Max. connected load	approx. 12 kW
Max. current consumption	approx. 22 A
Sound level (measured under free field conditions at 1 m distance from front)	approx. 63 dB(A)
Condenser	air-cooled
Humidification water	fully-demineralised, conductivity max. 20 µS/cm, ph-value 6 - 7, automatic supply (also possible manually), integrated reservoir with a volume of approx. 20 l
Condensation drain	back-pressure-free, ¾" hose connection
Weight	approx. 1100 kg

The above mentioned output data is based on an ambient temperature of max. +25 °C, 400 V/50 Hz nominal voltage, without specimen, without additional equipment and heat compensation.

The admissible ambient conditions range from +10 to +35 °C. The allowable relative air humidity must not exceed 75 % r.h.

Subject to technical modifications.

Design and Functional Description

The climate test chambers System Weiss are supplied ready for connection. Compact design means a minimum of space is required. No more assembly and commissioning on site.

The machine section incorporating the refrigeration unit, the water storage tank and the water pump is located below the test chamber. The swing-out switch cabinet is located on the rear of the chamber. The operating elements and the main switch are located on the right hand side of the chamber.

Exterior housing

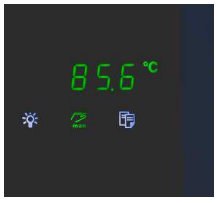
The exterior housing of the unit is made from lightweight corrosion-resistant, self-supporting, galvanised sheet-steel and lacquered in two colours.

The environmental-friendly insulation between test chamber and exterior housing guarantees best insulation values and minimum operating costs.

Test space

The test space consists of a stainless-steel container and is welded vapour-tight. The test chamber is easy to clean thanks to special welding, smooth surfaces, rounded edges and embossed shelf supports. The rear test chamber wall incorporates a recirculated-air duct with built-in humidifier tub, built-in heat exchanger, electric heaters and a recirculated air fan. Air guidance via baffle plates in the test chamber floor and ceiling produces optimum ambient air and temperature distribution.

Test chamber door



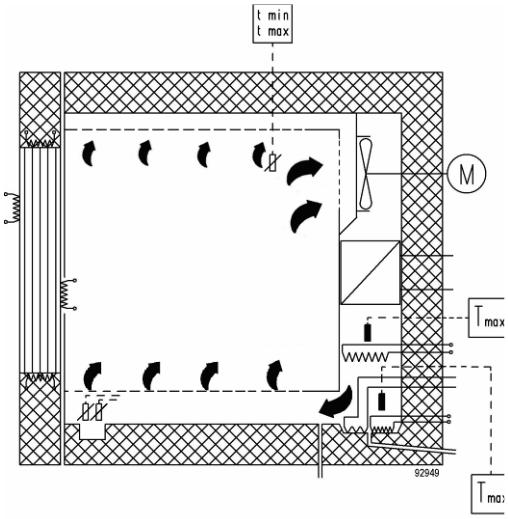
The test chamber door opens fully for easy access and is provided with high quality insulation. A perfect seal is guaranteed by special profile seals. The optimum contact pressure is ensured. An illuminated observation window is available as an option.
The current operating state is displayed on the CONTROLPAD in the test space door.

Access ports

All sizes have two access ports, which are integrated in the left and right side walls and can be used for measuring and control wires, other supply connections or accessories.

If not required, these ports are closed with rubber plugs supplied as standard.

Temperature and humidity conditioning



The generously dimensioned axial fan with an external drive motor draws the air out of the space. (The test chambers with a test space volume of 1000 l and 1500 l have two circulating fans each).

This circulating air then flows through a fin-type heat exchanger in which it is cooled if required.

Special circuits prevent any undesired formation of condensate on the heat exchanger during climatic operation and ensure the best possible temperature and humidity contancies in time.

An electrical heater, installed behind the heat exchanger in air direction, heats the circulating air.

The air then passes over a water bath; integrated heating and cooling elements ensure quick and precise temperature-conditioning of the water and aerosol-free humidification and dehumidification.

The humidity of the test space air depends on the water temperature.

The re-developed, patented climatic system enables a high relative humidity even with a heat load.

Psychrometric humidity measurement

The humidity of the test space air is measured according to the internationally valid psychrometric measuring principle with two resistance thermometers Pt 100 as per DIN IEC 751.

Dry and wet bulb sensors are arranged next to each other in the circulating air flow. Depending on the climate the material of the wet bulb sensor is humidified.

The life time is increased considerably due to self-cleaning mechanism!

Protection system against condensation

The protection system consists of a dehumidifying evaporator which prevents condensation forming on the specimens as they heat-up after tests at low temperatures.

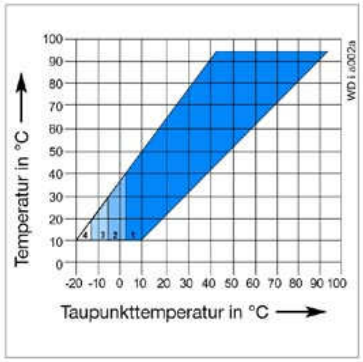
The protection system's operating range is -40 to +60 C.

The protection system against condensation is activated by a digital switch channel.

It is possible to switch on the protection system manually or to integrate it into a program.

Dew point extension from +4°C to -3 °C

In this working range the humidity constancy in time is < ±5 % r.h.
The extended working range can be operated at intervals.
The max. operation time without defrosting is approx. 24 hrs.

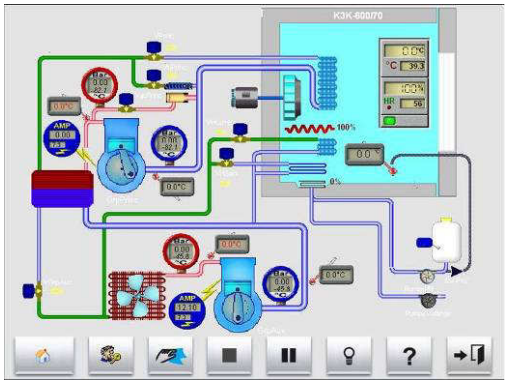


Auto-adaptive control system

Our test chambers are equipped with an integrated industrial computer system with a 12" TFT colour touch screen display to facilitate operation, monitoring and documentation. Our Windows S!MCONTROL software package provides maximum user comfort, transforming the test chamber into a communication wizard.

Simulation programs and test results are saved on the hard disk and can be exchanged via Ethernet or USB stick (optional) or they can be printed out on a USB printer.

Complete test information is at the user's fingertips, and the function of the unit is explained in an easily understandable manner on the integrated process visualisation system. The interaction between compressors, heating systems and valves is clearly illustrated.



Programming of tests is realised with a graphic editor. The programs are administrated on the hard disk.

In addition to the colour touch screen display, the **CONTROLPAD** installed in the door provides information regarding the current temperature and relative humidity in the unit. Its function keys are available for direct switching on and off of testing and of the test chamber lighting. It has an alarm display and an acoustic alarm. The diagnosis system is activated on the touch screen display at the touch of a button.

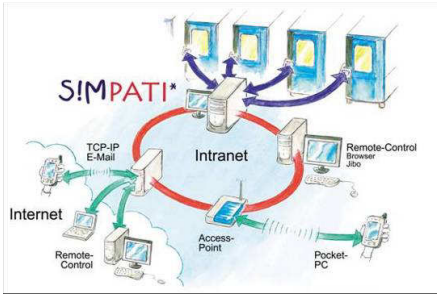
The software is available in German, English and Chinese.

Control is governed by the 32-bit I/0 system S!MPAC with integrated soft PLC. A web server can place test and diagnosis and maintenance information on the internet via Ethernet if desired.

Remote control and monitoring

If the unit is connected to the network, it can be reached and even controlled at almost any place in the world. To that end, network access to the file system of the unit on the intranet is sufficient or, after authorisation clearance, on the internet itself.

Operation is the same on the unit or on the network and there is full access to all simulation programs and saved archives.



Networking

The units are compatible with the S!MPATI software package and can be integrated into their networking environment. (Data logging operation in S!MPATI).

Permanently memorised thermostat heating safety

A **steady** state overheating safety thermostat is installed that automatically switches off the heater if the test chamber's maximum temperature range is exceeded.

Protection of Humidifier against Overheating

The water bath of the climate test chamber is protected against overheating.

Power Supply

Each functional circuit is equipped with its own safety device, which, in the event of trouble, turns off the affected circuit or the entire chamber. The nature of the trouble is visually displayed.

Wiring and electrics are governed by the latest technology and strictly conform to safety regulations for electrical installations and materials, as well as to relevant VDE regulations.

Weiss Test Systems are equipped with a lockable main switch according to VDE.

General Information

In the constant effort to improve our product, we reserve the right to make construction or design changes without notice or obligation.

The admissible ambient temperature for storage of the chamber is +55 °C (+131 °F).

Accuracy rates are proven in the test space centre with empty test space, in steady state, without specimens, without radiation and without additional equipment in the test space. The cooling down rate stated refers to the temperature range without controlled humidity.

Noise measurements and sound level data are effected as per DIN 45 635, part 1, accuracy class 2.

Please keep in mind that outgassing of specimens and connection lines might cause corrosion of components.

Corrosive gasses might escape among others from chip boards, cardboard boxes and bandaging materials.

If outgassing is to be expected, we recommend an optional ventilation of the test space with a purge air volume.

If outgassing or pollution is expected, we also recommend a regular maintenance of the measuring system

Since 4th July 2007, operators are obligated to test all stationary refrigeration and air conditioning systems from a capacity of 3 kg FKW and H-FKW (i.e. R 404 A and R 23)for their tightness at least once a year and to keep a system logbook. We would be pleased to conduct these tasks for you as a competent partner! Please do not hesitate to ask us!

Even with perfect manufacturing and maintenance faults can still occur. These failures may cause damage of your test specimens. If you wish to avoid these (e.g. valuable specimens) please contact us so we may advise you on the necessary additional measures to be taken.

Please note that the sealing material and cable insulation used in our test units and systems contains silicone. If this is a problem for you, please contact us.

[1] applies to refrigerants R 404 A and R 507; the temperature for R 134 a and R 23 is approx. +75 °C (+167 °F).

Scope of Supply

Climate Test Chamber, System Weiss, Type WK3-2000/40
complete and ready for connection, including:

- Industrial PC with Windows XP Embedded incl. software package S!MCONTROL
- Operating mode display in chamber door „**CONTROLPAD**“
- Digital measuring and control system S!MPAC
- Big 12“ TFT colour touch screen display
- Ethernet interface
- USB interface
- Serial interface RS 232 C
- Auto-adaptive control system with continuous self-optimisation
- Air-cooled refrigeration unit with environment-friendly refrigerants
- 1 shelf
- 1 port approx. 50 mm ∅, positioned in left side wall
- 1 port approx. 125 mm ∅, positioned in right side wall
- Water reservoir with level indicator and automatic water supply
- 4 potential-free outputs
- 4 inputs (24 VDC)
- Condensation protection with dehumidifier coil to prevent condensation on the specimen
- Digitally adjustable high/low temperature fuse with separate sensor
- Self-cleaning psychrometric humidity sensor
- Calibration of 2 temperature and 2 climate values
- 1 operating manual
- Technical documentation / operating manual

Technical Documentation/ Operating Manual

The technical documentation includes:

- 1 operating manual for chamber
- 1 operating for control unit
- Service manual incl. PI diagram, wiring diagram and units/parts list
- Declaration of conformity
- Quality inspection certificate